

REMARKS

In an office action mailed June 26, 2002, claims 1-8 and 11-18 have been rejected. By this amendment, claims 1-8 and 11-18 have been cancelled and new claims 19-36 have been added. Hence, claims 19-36 are pending in the application.

In the office action, the Examiner has brought to Applicants attention that an Abstract of the invention has not been submitted on a separate sheet in accordance with 37 C.F.R. 1.52(b)(4). In response, Applicants submit herein an Abstract on a separate sheet in accordance with 37 C.F.R. 1.52(b)(4). Applicants thank Examiner White for bringing this to their attention.

Applicants submit herewith an unexecuted Declaration Under 37 C.F.R. §1.132 on behalf of co-inventor, Ron Kesselmans. A supplemental response will follow submitting the exact Declaration properly executed.

In the office action, claim 6 has been objected to; claims 3, 6, and 11-18 have been rejected under 35 U.S.C. §112, second paragraph; claim 8 has been rejected under 35 U.S.C. §102(b); and claims 1- and 11-18 have been rejected under 35 U.S.C. §103(a). In response to the above objection and rejections, Applicants submit the following:

The Invention

Applicants have surprisingly discovered that a root or tuber starch comprising at least 95 wt.% of amylopectin is more efficiently oxidized than conventional root or tuber starches,

and much more efficiently oxidized than waxy corn starch. The present invention is advantageous over the prior art in that the present invention has a high reaction rate, yet utilizes much less catalyst.

A root or tuber starch comprising at least 95 wt.% of amylopectin (herein referred to as "amylopectin potato starch" or "APS") is not a naturally occurring starch. Conventional root or tuber starches contain about 20% amylose and 80% amylopectin. By genetically modifying a root or tuber starch to eliminate or inhibit the expression of granule bound starch synthase (GBSS), it is possible to cultivate a root or tuber starch having little or no amylose, and, mostly or all amylopectin. See pages 4-5 of the specification.

As evidenced by the attached Declaration Under 37 C.F.R. §1.132 of co-inventor, Ron Kesselmans, cultivation of root or tuber starches having at least 95 wt.% of amylopectin was not known until around 1987. See Declaration, paragraph 5. Applicants have surprisingly discovered that the cultivated APS has unique properties, which were unexpected, with respect to oxidation. See Declaration, paragraph 6.

Claim Objection

The Examiner has objected to claim 6 for containing improper punctuation. Claim 6 has been cancelled. Thus, the objection of claim 6 is rendered moot.

Rejections Under §112, Second, Paragraph

Claims 3, 6, and 11-18 have been rejected under §112, second paragraph as allegedly being indefinite. The Examiner has rejected claims 3 and 6 for reciting broad limitations together with narrow limitations. In response, claims 3 and 6 have been cancelled. Hence, the rejection of claims 3 and 6 under §112 has been rendered moot.

In the office action, claims 11-18 have been rejected under §112, second paragraph for improperly depending on claim 1. In response, claims 11-18 have been cancelled. Thus, the rejection of claims 11-18 under §112 has been rendered moot.

Rejections Under §102(b)

Claim 8 has been rejected under §102(b) as being anticipated by Whistler et al., *Oxidation of Amylopectin With Hydrogen Peroxide at Different Hydrogen Ion Concentrations*, The Journal of American Chemical Society, Vol. 81, pages 3136-3139 (1959). By this amendment claim 8 has been cancelled. New claim 28 corresponds to cancelled claim 8.

The Examiner contends that Whistler et al. "discloses oxidation of amylopectin with hydrogen peroxide, which anticipates the oxidized starch of instant claim 8, which comprises at least 95wt.% of amylopectin." Applicants respectfully disagree.

Whistler et al. disclose the oxidation of amylopectin derived from commercial corn starch. In stark contrast, new claim 28 relates to an oxidized starch that is obtained by a process comprising treating a root or tuber starch comprising at least 95 wt.% of amylopectin with hydrogen peroxide in the presence of divalent copper ions.

As discussed above, naturally occurring root or tuber starches contain no more than about 80% amylopectin. The cultivation of root or tuber starches having at least 95 wt.% of amylopectin was not known until about 1987. See Declaration, paragraph 5. Whistler et al. was published in 1958, about thirty (30) years before the discovery of APS.

Furthermore, Whistler et al. do not disclose oxidation of starch in the presence of divalent copper ions, acting as a catalyst.

Hence, Whistler et al. do not disclose an oxidized starch obtained by a process comprising treating a root or tuber starch comprising at least 95 wt.% of amylopectin with hydrogen peroxide in the presence of divalent copper ions. Therefore, Whistler et al. does not anticipate claim 8 (claim 28).

Accordingly, Applicants respectfully request that the rejection under § 102(b) based on Whistler et al. be reconsidered and withdrawn.

Rejections Under §103(a)

Claims 1-8 have been rejected under §103(a) as being allegedly unpatentable over U.S. Patent No. 3,975,206 to Lotzgell et al. in view of U.S. Patent No. 3,539,366 to Ewing.

Lotzgell et al. disclose a process for oxidizing starch. Lotzgell et al. do not disclose or suggest the oxidation of a root or tuber starch comprising at least 95 wt.% of amylopectin. In fact, Lotzgell et al. has a filing date of 1974, about ten (10) years prior to the discovery of APS. See Declaration, paragraph 5.

The Examiner admits that Lotzgell et al. do not disclose the use of divalent copper ions in the oxidation of starch. However, the Examiner contends that because Ewing shows the use of divalent copper ions in processes for oxidizing starches, it would have been obvious to combine the teachings of Lotzgell and Ewing. Applicants respectfully disagree.

As discussed above, in addition to not disclosing divalent copper ions, Lotzgell et al. do not disclose or suggest oxidation of APS. Ewing also does not disclose a process for oxidizing APS. Ewing has a filing date of 1968, about twenty (20) years prior to the discovery of APS. Both Lotzgell et al. and Ewing are concerned with the oxidation of corn starch, which has very different properties than APS. For example, APS has a much lower content of lipids and proteins than waxy starches, such as corn starch. Lipids and proteins contribute to problems with starch products, such as odor and foaming. See page 5 of the application.

There is absolutely no suggestion in either Lotzgell et al. or Ewing that the efficiency of the oxidation process can be improved by using a root or tuber starch having an amylopectin content of at least 95%, i.e. APS. Furthermore, one of ordinary skill in the art, would not expect the efficiency of oxidation to be improved when a root or tuber starch having at least 95 wt.% of amylopectin based on the dry substance of the starch is used. See declaration, paragraph 6.

Hence, upon reading the combined disclosure of Lotzell et al. and Ewing, one of ordinary skill in the art, would not be motivated to use an APS in the claimed process or arrive at the claimed starch products.

In order to establish a *prima facie* case of obviousness, one of the criteria to be met is that the prior art references, when combined, must teach or suggest all of the claim limitations. See MPEP §2142.

Applicants' have demonstrated the importance of utilizing an APS, in the oxidation process of the claimed invention.

Upon combining the teachings Lotzgell et al. and Ewing, all of Applicants' claimed limitations are not taught or suggested. Therefore, based on the foregoing discussion, Applicants' claimed invention is not obvious over Lotzgell et al. in view of Ewing.

Claims 11-18 have been rejected under §103(a) as being unpatentable over Lotzgell et al. and Ewing as applied to claims 1-8, and further in view of JP 07138898 to Torigoe or

U.S. Patent No. 4,943,612 to Morita et al. Claims 11-18 have been cancelled. New claims 28-36 correspond to cancelled claims 11-18.

The Examiner states that the indicated applications of the oxidized starch product recited in claims 11-18 are known in the art as suggested in Torigoe and Morita. The Examiner also states that "the allowance of claims 11-18 depends on the allowance of the oxidized starch product" and that "it would have been obvious to one of ordinary skill...to substitute the oxidized starch used in...Torigoe...or the oxidized starch used in...Morita...with the oxidized starch of the Lotzgell and Ewing patents..." Applicants respectfully disagree.

A copy of a computer translation of Torigoe (from Japanese to English) is attached hereto for the Examiner's convenience. Torigoe discloses a surface-size agent for the manufacture of newsprint. Torigoe discloses the use of oxidized starch product made from corn starch. There is no disclosure or suggestion to use an APS, or of the oxidation process of the claimed invention.

Morita discloses the use of an aqueous polymer latex emulsion, together with conventional ingredients in forming an adhesive composition. An optional ingredient can be an oxidized starch. Morita does not disclose or suggest the use of an APS, or the oxidation process of the claimed invention.

As discussed above, one of ordinary skill in the art, would not expect the efficiency of oxidation to be improved when a root or tuber starch having at least 95 wt.% of amylopectin

based on the dry substance of the starch is used. See declaration, paragraph 6.

Hence, upon reading the combined disclosure of Lotzgell et al. in view of Ewing and further in view of Morita and Torigoe, one of ordinary skill in the art, would not be motivated to use an APS in the claimed process or arrive at the claimed starch products.

In order to establish a *prima facie* case of obviousness, one of the criteria to be met is that the prior art references, when combined, must teach or suggest all of the claim limitations. See MPEP §2142.

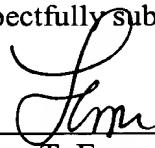
Applicants' have demonstrated the importance of utilizing an APS, in the oxidation process of the claimed invention.

Upon combining the teachings Lotzgell et al. in view of Ewing, and further in view of Torigoe and Morita, all of Applicants' claimed limitations are not taught or suggested. Therefore, based on the foregoing discussion, Applicants' claimed invention is not obvious over Lotzgell et al. in view of Ewing, and further in view of Torigoe and Morita.

Accordingly, Applicants respectfully request the above rejections under §103(b) be reconsidered and withdrawn.

In light of the foregoing amendments and remarks, Applicants respectfully submit that the application is now in condition for allowance. If the Examiner believes a telephone discussion with the Applicant's representative would be of assistance, she is invited to contact the undersigned at her convenience.

Respectfully submitted,



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ABSTRACT

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The invention relates to a process of oxidizing starch wherein a root or tuber starch comprising at least 95 wt.% based on dry substance of the starch of amylopectin, or a derivative thereof, is treated with hydrogen peroxide in the presence of a catalyst, which catalyst comprises divalent copper ions.